United States
Environmental Protection
Agency

Environmental Monitoring
Systems Laboratory
P.O. Box 93478
Las Vegas, NV 89193-3478

TS-PIC-88710
May 1988



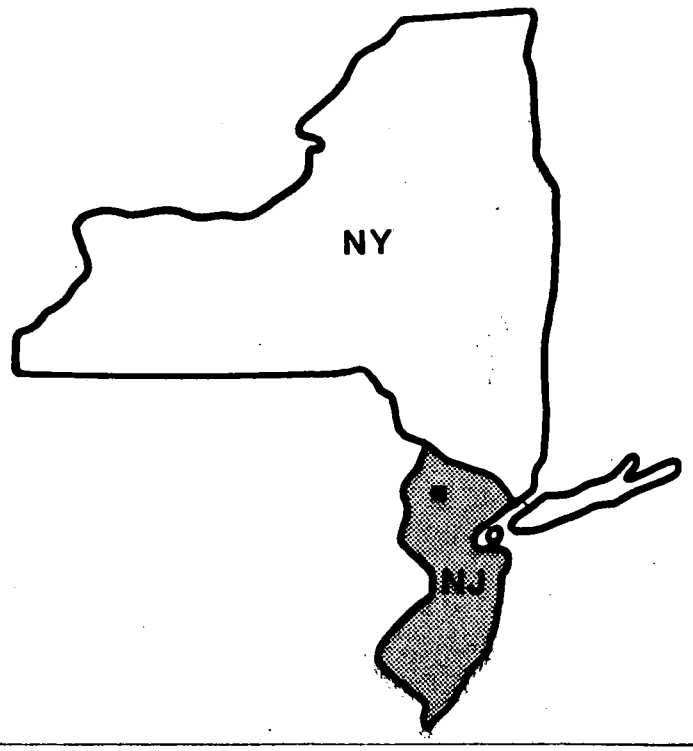


Research and Development

EPA

# AERIAL PHOTOGRAPHIC ANALYSIS OF THE COMBE FILL SOUTH LANDFILL Chester, New Jersey

EPA Region 2



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# AERIAL PHOTOGRAPHIC ANALYSIS OF THE COMBE FILL SOUTH LANDFILL

Chester, New Jersey

by

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Las Vegas, Nevada 89193-3478

Contract No. 68-03-3245

Project Officer

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ENVIRONMENTAL MONITORING SYSTEMS LABORATORY
OFFICE OF RESEARCH AND DEVELOPMENT
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NOTICE

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## ABSTRACT

This report presents a historical aerial photographic analysis of the approximately 95 acre Combe Fill South Landfill located approximately 2 miles west southwest of Chester, New Jersey. Aerial photography, spanning 49 years (1939-1987), was used as the primary data input for preparation of this report.

The dumping of waste material at this landfill began sometime between late 1939 and April 1951. In December 1939 land use in the area consisted of farmland and open pasture. A trench, a small pile of solid waste, and trash strewn along the access road to the trench were noted in April 1951, indicating dumping activity was occurring. In 1957 the trench was covered by a large fill mound. Another trench was noted adjacent to the mound. Five small, unlined impoundments were noted near the entrance to the landfill. A significant increase in dumping activity was noted on the 1963 photograph. The landfill consisted of two large fill mounds. Two additional fill mounds were noted atop one of the larger mounds. Several piles of solid waste were noted. The five impoundments noted previously were no longer visible. The 1966 photograph revealed a large trench had been excavated in one of the large fill mounds. This trench was filled and covered on the 1970 photograph. The landfill continued to expand through 1984. The 1987 photograph showed it was still active with new mound layers being added atop previously covered fill mounds.

The U.S. Environmental Protection Agency's Environmental Monitoring Systems Laboratory in Las Vegas, Nevada, prepared this report for the Agency's Emergency and Remedial Response Division in Region 2 in New York, New York and the Office of Emergency and Remedial Response in Washington, D.C.

CONTENTS



FIGURES



TABLE

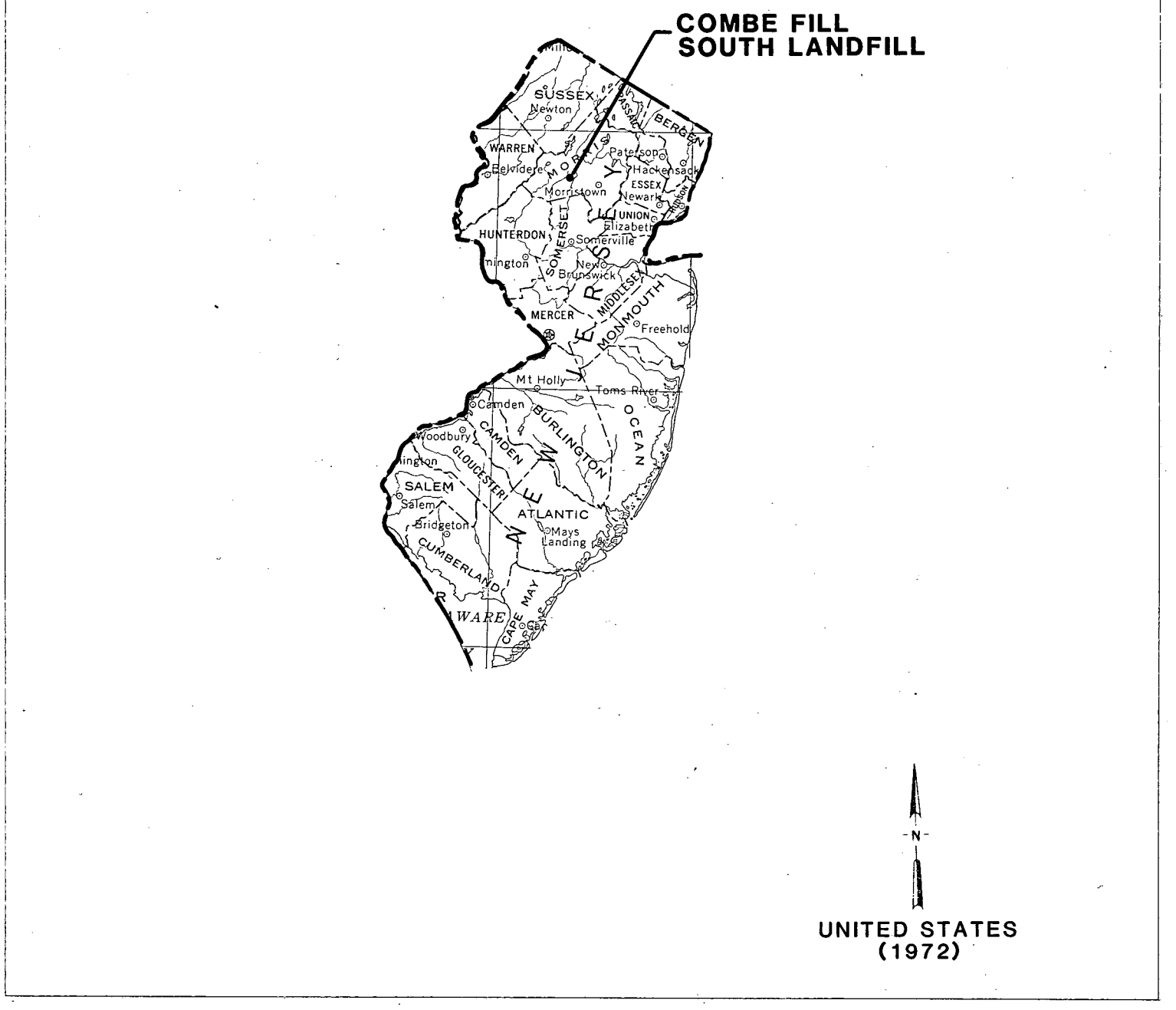



Figure 1. Site location map, New Jersey. Approximate scale 1:2,500,000.

# INTRODUCTION

This report presents a historical photographic analysis, utilizing aerial photography for informational input, of the Combe Fill South Landfill located in Morris County, New Jersey. The site is approximately 2 miles west southwest of Chester, New Jersey (Figure 1). The site boundaries, as delineated in this report, are not intended to denote legal property lines nor EPA determinations of site extent. They are the analyst's approximation of site extent based upon visual indicators. The aerial photography spans 49 years, from 1939 to 1987. The site is being studied under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) more popularly referred to as "Superfund". Focus of the report is on disposal practices, leachate seepage, ponding of liquids, litter, and re-exposure of waste materials due to cover erosion.

The U.S. Environmental Protection Agency's Environmental Monitoring Systems Laboratory in Las Vegas, Nevada, prepared this report for the Agency's Emergency and Remedial Response Division in Region 2 in New York, New York and the Office of Emergency and Remedial Response in Washington, D.C.

## METHODOLOGY

Stereoscopic pairs of aerial photographs are used to perform the analysis. Stereo viewing enhances the interpretation because it allows the analyst to observe the vertical as well as horizontal spatial relationships of natural and cultural features. Stereoscopy is also an aid in distinguishing between various shapes, tones, textures, and colors that can be found within the study area.

Evidence of waste burial is a prime consideration when conducting a hazardous waste analysis. Leachate or seepage resulting from burial and dumping of hazardous materials might threaten existing surface or ground-water sources. Pools of unexplained liquid are routinely noted because they can indicate seepage from buried wastes that may enter drainage channels and allow contaminants to move off the site. An excellent indicator of how well hazardous materials are being handled at a site is the presence or absence of spills, spill stains, and vegetation damage. Trees and other forms of vegetation that exhibit a marked color difference from surrounding members of the same species are labeled "dead," "stressed," or "damaged" based upon the degree of noticeable variation. Vegetation is so labeled only after consideration of the season in which the photographs were acquired.

The U.S. Environmental Protection Agency's Statement of Procedures on Floodplain Management and Wetlands Protection (Executive Orders 11988 and 11990, respectively) requires EPA to determine if removal or remedial actions at hazardous waste sites will affect wetlands or floodplains and to avoid or minimize adverse impacts on those areas. To aid in compliance with these orders, significant wetland areas located within and adjacent to the sites have been identified and delineated. However, the sites have not been visited to verify the accuracy of wetland identification.

Drainage analysis determines the direction a spill or surface runoff would follow. Direction of drainage is determined from analysis of the photographs and from U.S. Geological Survey topographic maps. Whenever they are available, 7.5-minute quadrangle maps (scale 1:24,000) are used to show site location and to provide geographic and topographic information.

Results of the analysis are shown on annotated overlays attached to the photos. The following table provides documentation of the photographs used in this report:

TABLE 1. DOCUMENTATION OF AERIAL PHOTOGRAPHY

| Site name, location, and geographic coordinates | Figures | Date of acquisition | Original scale | Film type† | Photo source‡ | Project | Roll | Line | Frame |
|---|---|---|---|---|---|---|---|---|---|
| Combe Fill | 3 | 12-12-39 | 1:20,000 | B&W | WAI | UNK | UNK | 4 | 116 |
| South Landfill | 4 | 04-24-51 | 1:20,000 | B&W | WAI | UNK | UNK | 289 | 4362 |
| Chester, NJ | 5 | 05-07-57 | 1:20,000 | B&W | ASCS | EAR | UNK | 4R | 95 |
| 40°46.3'N | 6 | 05-07-63 | 1:20,000 | B&W | ASCS | EAR | UNK | 2DD | 135 |
| 074°44.3'W | 7 | 05-11-66 | 1:24,000 | B&W | WAI | 1580 | UNK | 4 | 71 |
| | 8 | 02-24-70 | 1:24,000 | B&W | EROS | VCLD | UNK | 2 | 260 |
| | 9 | 04-03-74 | 1:18,000 | B&W | WAI | 2063 | UNK | 25 | 5376 |
| | 10 | 07-07-79 | 1:40,000 | B&W | ASCS | 34027 | UNK | 178 | 90 |
| | 11 | 03-26-84 | 1:58,000 | CIR | ASCS | NHAP | UNK | 181 | 35 |
| | 12 | 12-18-87 | 1:5,600 | CC | EMSL | 88710 | UNK | 1 | 5 |
| | 13 | 12-18-87 | Oblique | CC | EMSL | 88710 | UNK | 2 | 19 |

†Film type identification:
B&W: Black-and-White
CIR: Color Infrared
CC: Conventional Color

‡Photo source identification:
ASCS: U.S. Department of Agriculture, Agricultural Stabilization and Conservation Service, Salt Lake City, Utah.
EMSL: U.S. Environmental Protection Agency, Environmental Monitoring Systems Laboratory, Las Vegas, Nevada.
EROS: U.S. Department of the Interior, Geological Survey, Earth Resources Observation Systems Data center, Sioux Falls, South Dakota.
WAI: Western Atlas International, Aero Services Division, Houston, Texas.

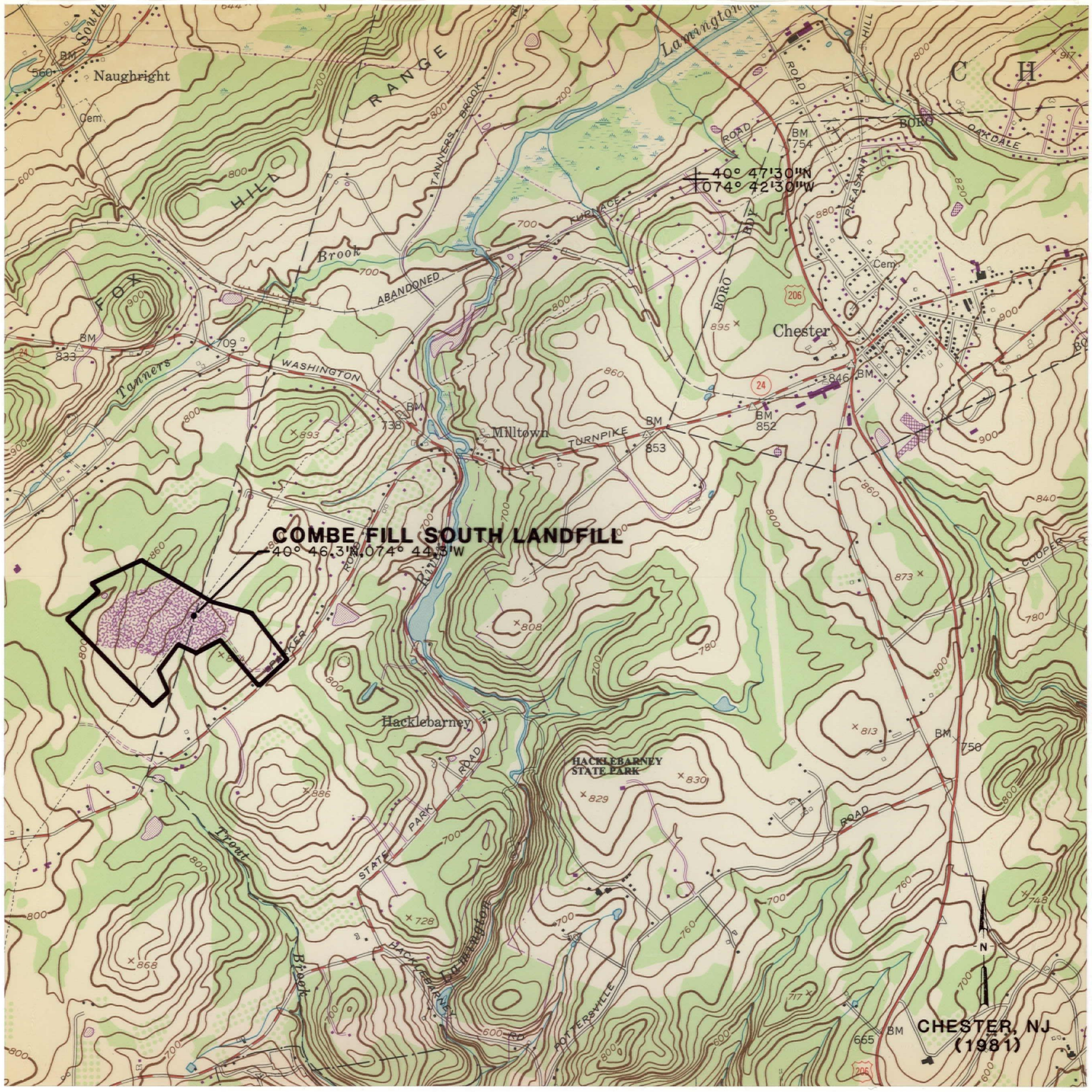



Figure 2. Local site location map, Chester, New Jersey. Scale 1:24,000.

## ANALYSIS SUMMARY

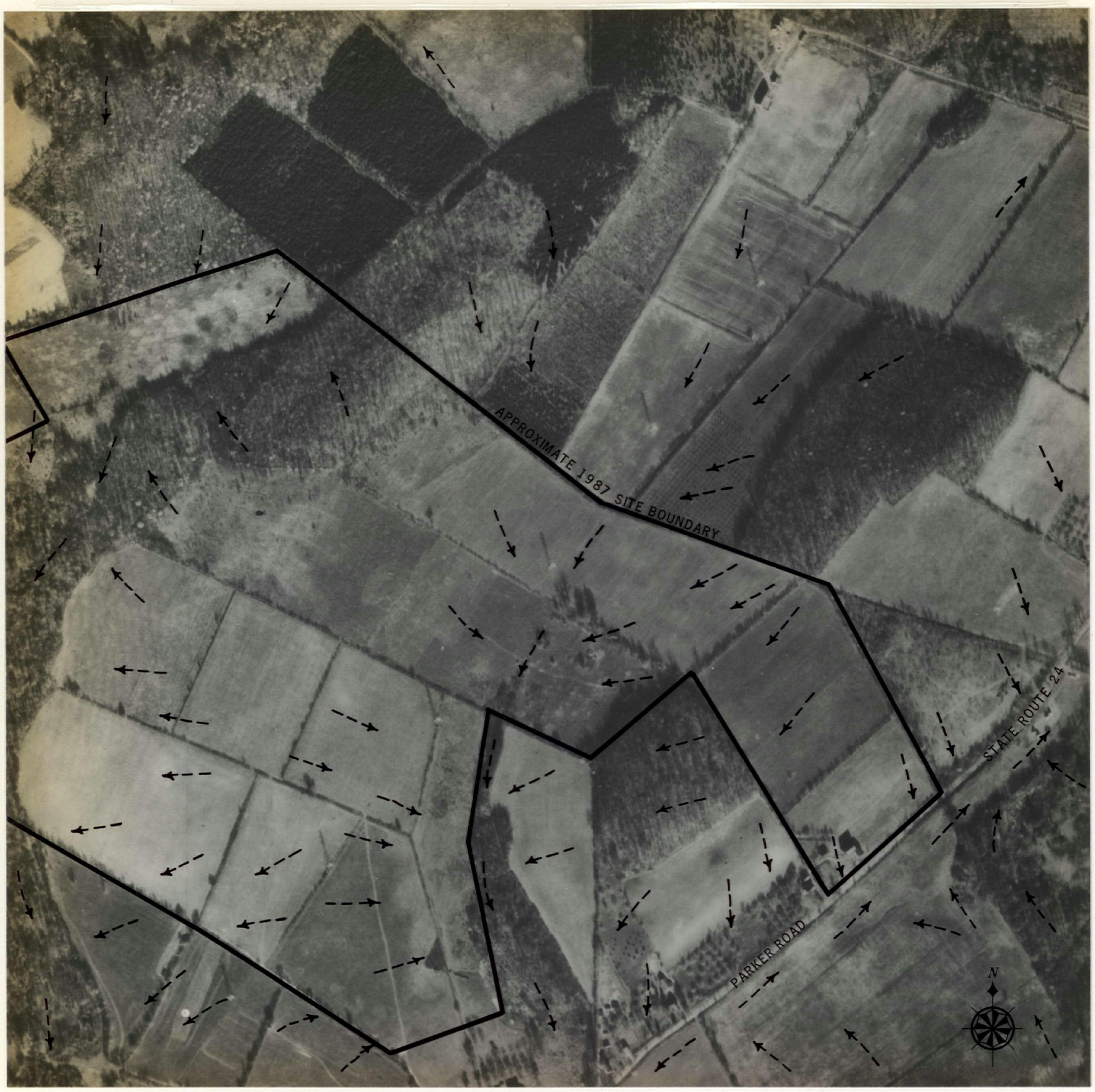
The Combe Fill South Landfill covers approximately 95 acres in Morris County, New Jersey, approximately 2 miles west southwest of Chester (Figure 2). The landfill sits on gently rolling terrain and is accessed from Parker Road. Drainage at the site is omnidirectional trending to the south. Trout Brook flows southeasterly along the southwest perimeter of the site and empties into the Lamington River which flows south approximately 0.5 miles east of the site. No wetlands are noted on or adjacent to the site. The landfill would not appear to be threatened with inundation during a 100-year flood event.

Combe Fill South Landfill was first noted active on the April 1951 photography. The earliest photography acquired was 1939 and showed the predominant land use was farmland and open pasture. In 1951, a trench, a small pile of solid waste, and trash strewn along the access road were noted. In 1957, a large fill mound was noted covering the previously noted trench. Another small trench was noted adjacent to the fill mound. Five small, unlined impoundments were also noted. Several new fill mounds were noted on the 1963 photography, but the impoundments were no longer present. The size of the mounds continued to increase through the latest photography obtained in 1987. This photo coverage showed most of the older mounds had been capped and reseeded. A new layer of fill was being laid on one of the mounds. The largest of the old mounds was heavily eroded and had ponded liquid, in spots, on the top cover. No breakout of buried waste was visible along the eroded sides of this mound.

## PHOTO ANALYSIS

DECEMBER 12, 1939 (FIGURE 3)

The Combe Fill South Landfill is not yet operational. The area which the site will occupy is outlined on the photo and consists of gently rolling terrain occupied predominantly by farm tracts and open pasture. The areal drainage is omnidirectional off the rolling hills with an overall tendency to the southwest. A few farmsteads are located along Parker Road (State Route 24).




## INTERPRETATION CODE

### BOUNDARIES AND LIMITS

- FENCED SITE BOUNDARY
- UNFENCED SITE BOUNDARY
- FENCE
- STUDY AREA

### DRAINAGE

- DRAINAGE
- FLOW DIRECTION
- INDETERMINATE DRAINAGE

### TRANSPORTATION/UTILITY

- VEHICLE ACCESS
- RAILWAY

### SITE FEATURES

- DIKE
- STANDING LIQUID
- SL STANDING LIQUID
- EXCAVATION, PIT (EXTENSIVE)
- MOUNDED MATERIAL (EXTENSIVE)
- MM MOUNDED MATERIAL (SMALL)
- CR CRATES/BOXES
- DR DRUMS
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- PT PRESSURE TANK
- VT VERTICAL TANK
- CA CLEARED AREA
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- FL FILL
- IM IMPOUNDMENT
- LG LAGOON
- OF OUTFALL
- SD SLUDGE
- ST STAIN
- SW SOLID WASTE
- TR TRENCH
- VS VEGETATION STRESS
- WD WASTE DISPOSAL AREA
- WL WETLAND

Figure 3. Combe Fill South Landfill, December 12, 1939. Approximate scale 1:5,175.

APRIL 24, 1951 (FIGURE 4)

This photo shows that waste disposal activities are possibly taking place at the Combe Fill South Landfill. A small trench, measuring approximately 35 feet by 210 feet, is visible within the site perimeter. Spoil piles are noted along both sides of the trench. A small pile of unidentified solid waste is located adjacent to the trench. Solid waste/trash is also noted along the dirt access road to the trench. The remainder of the area within the site remains relatively unchanged since the 1939 photo (Figure 3).


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Figure 4. Combe Fill South Landfill, April 24, 1951. Approximate scale 1:5,950.

MAY 7, 1957 (FIGURE 5)

Waste disposal activities at the Combe Fill South Landfill have increased since the 1951 photo coverage (Figure 4). An active waste disposal mound, measuring approximately 110 feet by 900 feet, is now visible. This mound covers the small trench noted in 1951. The northeast side of the mound is the working face. A small, unlined trench is noted on the southwest side of the fill mound. This trench measures approximately 50 feet by 290 feet and at the present time is empty. Five small, unlined impoundments, containing a light-toned liquid, are visible near the main entrance to the site. An earthen embankment surrounds these impoundments. A garage/maintenance building has also been added in this area. A dirt road extends from the fill mound to the northern portion of the site. One branch of the road terminates at an empty field, while the western branch extends to a dry pond. No dumping activity is currently visible in these areas, though the road's presence may be indicative of future activities.


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Figure 5. Combe Fill South Landfill, May 7, 1957. Approximate scale 1:5,550.

MAY 7, 1963 (FIGURE 6)

Waste disposal activity at the Combe Fill South Landfill has increased significantly since the 1957 photo coverage (Figure 5). The site appears to be an area fill layer operation. The southeastern fill mound measures approximately 420 feet by 510 feet. The northwestern fill mound is irregularly shaped and measures approximately 390 feet by 660 feet. Two fill mounds have been added atop the original layer of the northwest mound. These two mounds are approximately the same size, measuring approximately 125 feet by 610 feet. Two piles of solid waste are noted atop the southeastern fill mound. The working face of the site is located centrally along the southwestern slope. Another pile of solid waste and a pile of what appears to be cut brush are noted just east of the new fill mounds. No activity is noted at the end of the dirt road northwest of the fill area, though liquid is noted in the previously dry pond. An area of disturbed ground is also noted off the dirt road, near the pond. The five impoundments, located near the main entrance on the 1957 photo, have been removed and the area is now being used for vehicle parking.


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Figure 6. Combe Fill South Landfill, May 7, 1963. Approximate scale 1:5,175.

MAY 11, 1966 (FIGURE 7)

Little change is noted to the two northwestern fill mounds at the Combe Fill South Landfill since the 1963 photo coverage (Figure 6). A large trench has been excavated in the eastern half of the southeastern fill mound. Two large spoil piles, excavated from the trench, are noted on either side. A dragline is visible near the southern end of the trench. Solid waste is visible on the floor of the trench, which measures approximately 135 feet by 575 feet. Four small fill piles are noted west of the spoil piles. Disturbed ground, in an open field at the end of the dirt road north of the fill, is caused by bulldozer activity. The linear shape of some of the ground scarring may indicate burial activity in trenches. A bulldozer is noted active in the area. The disturbed ground, previously noted near the pond in 1963, is no longer visible. A new garage/maintenance building is noted in the entrance area to the site. An oil stain, probably due to vehicular traffic, is noted near the garage.

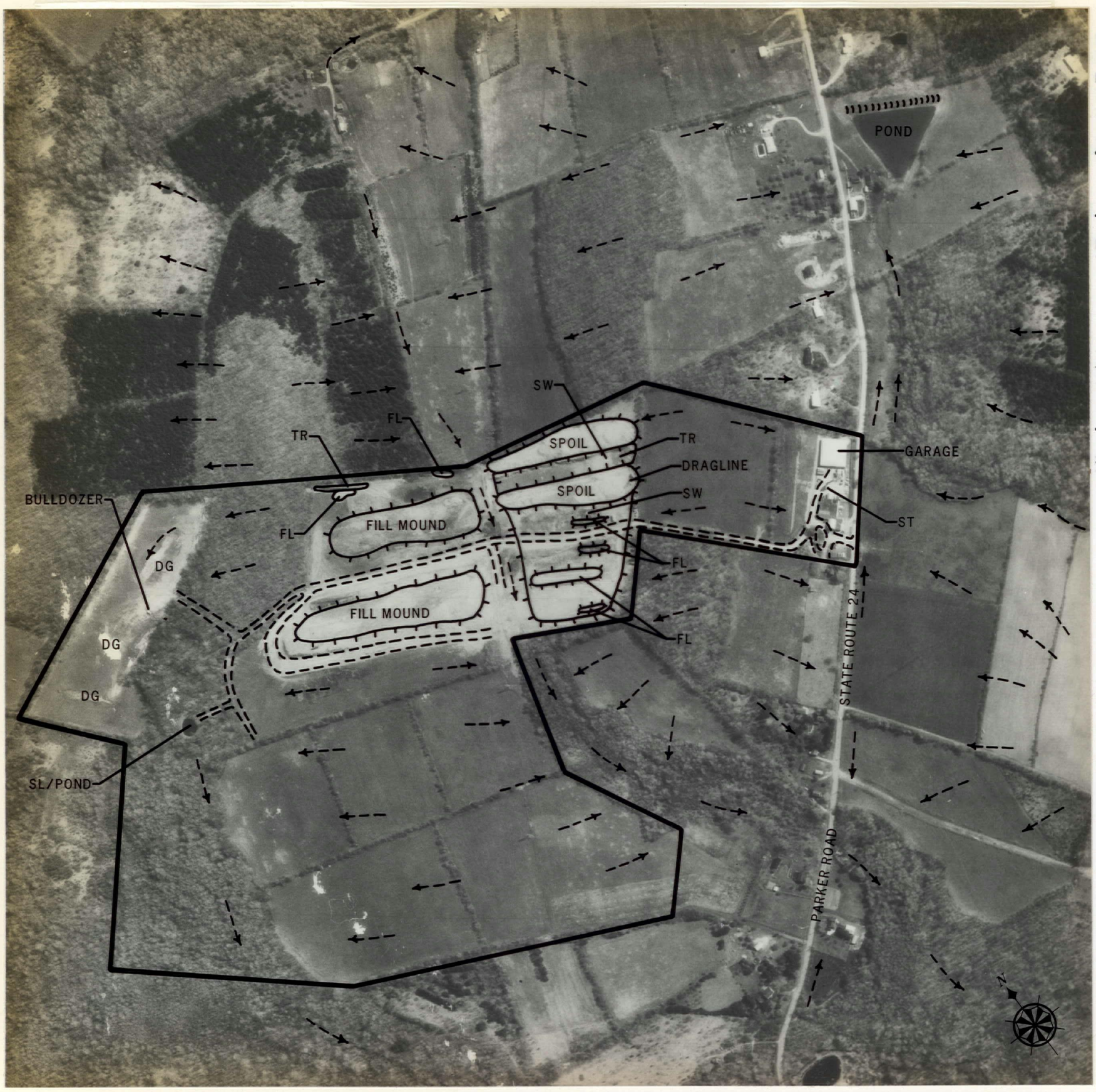


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Figure 7. Combe Fill South Landfill, May 11, 1966. Approximate scale 1:5,950.

FEBRUARY 24, 1970 (FIGURE 8)

Little change is noted at the Combe Fill South Landfill on this date. The fill mounds all appear weathered indicating a long period of inactivity. The large trench noted on the 1966 photo coverage (Figure 7) has been filled and covered. A new fill mound now covers this trench. Some excavating activity is noted on the northwestern mound. There are no visual indications of solid waste dumping on this date. The landfill appears to be well maintained.


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Figure 8. Combe Fill South Landfill, February 24, 1970. Approximate scale 1:5,175.

APRIL 3, 1974 (FIGURE 9)

Dumping activity continues at the Combe Fill South Landfill. The fill mounds have increased in size. A new cut has been made in the southeast mound and trash is being dumped in this area. Two cranes and a scraper are noted in the area. Some erosion is visible along the west side of this fill mound. The mottled appearance could indicate buried waste is surfacing in the area. It appears that the landfill is expanding further to the southwest. An additional fill mound and two small piles of trash are noted in this area.


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Figure 9. Combe Fill South Landfill, April 3, 1974. Approximate scale 1:5,950.

JULY 7, 1979 (FIGURE 10)

Continued dumping activity is noted at the Combe Fill South Landfill. It appears the southeastern mound has received recent cover material. The adjacent mound has partially revegetated. The northeastern mound also has sparse vegetation growth. It appears some excavation activity is going on at the northern end of this mound. The large mound has expanded further to the southwest, reflecting activity noted in this area on the 1974 photo coverage (Figure 9). The top of this mound has a "washboard" type appearance indicating a possible trench-type burial activity in the past. Several heavy duty type vehicles are noted on the mound indicating possible ongoing burial activity.

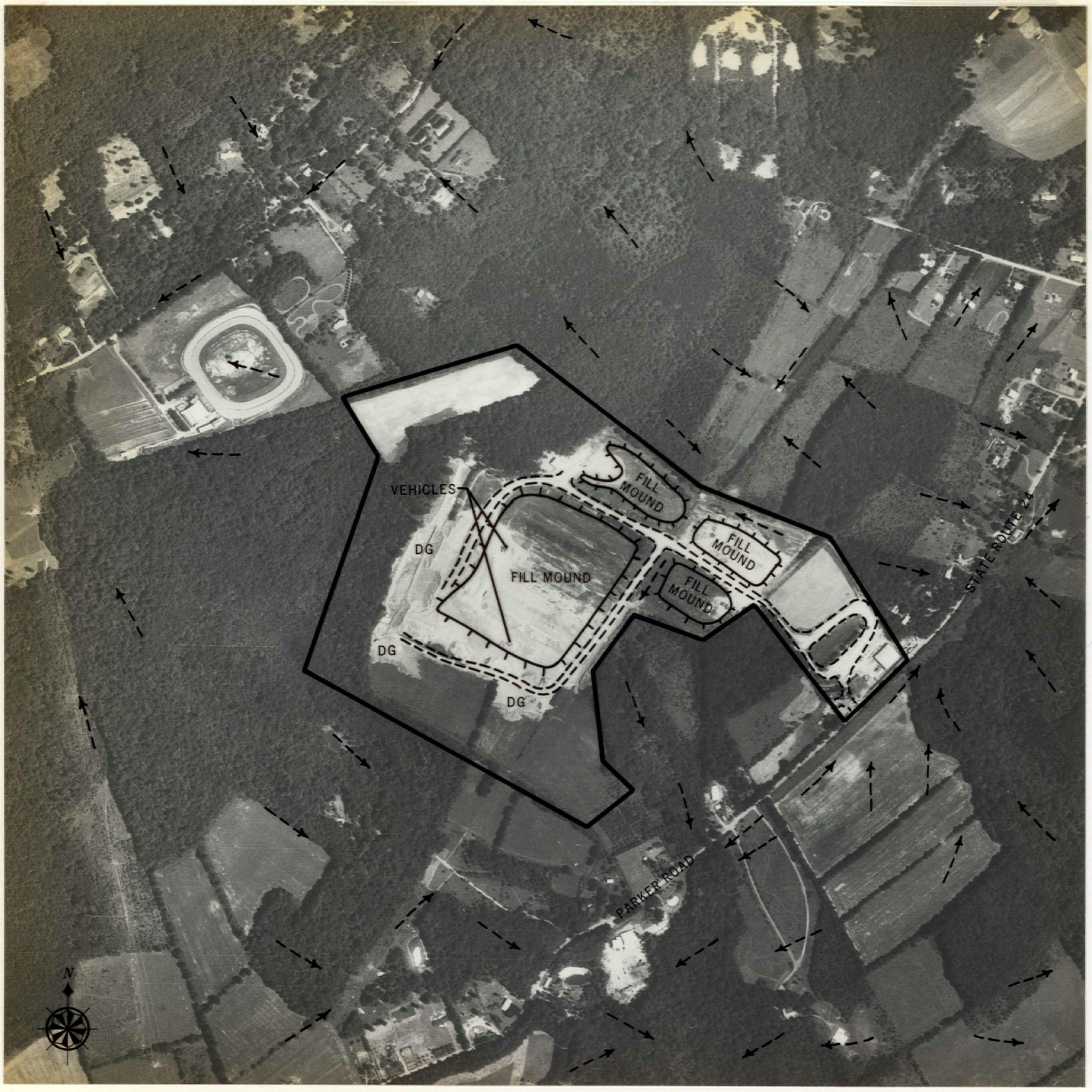


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Figure 10. Combe Fill South Landfill, July 7, 1979. Approximate scale 1:8,300.

MARCH 26, 1984 (FIGURE 11)

This high-altitude, color infrared photograph shows that the Combe Fill South Landfill is still active. The two southeastern mounds appear inactive and have a sparse vegetative growth cover. An additional layer has been added to the fill mound just to the north of these. It appears recent cover material has been applied to this new layer. The large fill mound has expanded further to the southwest. The top of this mound still shows the corrugated, washboard-type pattern associated with trench-typed disposal operations. Three pools of standing liquid are visible atop this mound. Vehicular activity along the access road to the fill areas indicates possible ongoing dumping activity.


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Figure 11. Combe Fill South Landfill, March 26, 1984. Approximate scale 1:13,750.

DECEMBER 18, 1987 (FIGURE 12)

Activity at the Combe Fill South Landfill appears to have decreased since the 1984 photo coverage. Old fill mounds 1 and 2 are covered with shrub-type vegetation. Portable trash bins and trash haul trailers are being stored in the area of the old fill mound 2. A new layer of fill is being added to fill mound 3. Piles of solid waste are noted on this new fill mound. No activity is noted at fill mound 4. Heavy erosion gullies are visible along the sides and across the top of this mound. The sparse vegetation cover on this mound appears stressed. Small pools of liquid are also visible atop the mound. These pools of liquid, most of which are iced over, may be the result of snowmelt. The weather may also be the contributing factor to the stressed appearance of the vegetation. No waste was visible along the heavily eroded sides of fill mound 4. A closed gate has been installed across the access road between fill mounds 1 and 2.


## INTERPRETATION CODE

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- FENCED SITE BOUNDARY
- UNFENCED SITE BOUNDARY
- FENCE
- STUDY AREA

### DRAINAGE

- DRAINAGE
- FLOW DIRECTION
- INDETERMINATE DRAINAGE

### TRANSPORTATION/UTILITY

- VEHICLE ACCESS
- RAILWAY

### SITE FEATURES

- DIKE
- STANDING LIQUID
- SL STANDING LIQUID
- EXCAVATION, PIT (EXTENSIVE)
- MOUNDED MATERIAL (EXTENSIVE)
- MM MOUNDED MATERIAL (SMALL)
- CR CRATES/BOXES
- DR DRUMS
- HT HORIZONTAL TANK
- PT PRESSURE TANK
- VT VERTICAL TANK
- CA CLEARED AREA
- DG DISTURBED GROUND
- FL FILL
- IM IMPOUNDMENT
- LG LAGOON
- OF OUTFALL
- SD SLUDGE
- ST STAIN
- SW SOLID WASTE
- TR TRENCH
- VS VEGETATION STRESS
- WD WASTE DISPOSAL AREA
- WL WETLAND

Figure 12. Combe Fill South Landfill, December 18, 1987. Approximate scale 1:5,950.

DECEMBER 18, 1987 (FIGURE 13)

This photograph presents an oblique view of the Combe Fill South Landfill. The scene is looking to the northwest.


Figure 13. Combe Fill South Landfill, December 18, 1987. Oblique looking northwest.

## INTERPRETATION CODE

### BOUNDARIES AND LIMITS

- FENCED SITE BOUNDARY
- UNFENCED SITE BOUNDARY
- FENCE
- STUDY AREA

### DRAINAGE

- DRAINAGE
- FLOW DIRECTION
- INDETERMINATE DRAINAGE

### TRANSPORTATION/UTILITY

- VEHICLE ACCESS
- RAILWAY

### SITE FEATURES

- DIKE
- STANDING LIQUID
- SL — STANDING LIQUID
- EXCAVATION, PIT (EXTENSIVE)
- MOUNDED MATERIAL (EXTENSIVE)
- MM — MOUNDED MATERIAL (SMALL)
- CR — CRATES/BOXES
- DR — DRUMS
- HT — HORIZONTAL TANK
- PT — PRESSURE TANK
- VT — VERTICAL TANK
- CA — CLEARED AREA
- DG — DISTURBED GROUND
- FL — FILL
- IM — IMPOUNDMENT
- LG — LAGOON
- OF — OUTFALL
- SD — SLUDGE
- ST — STAIN
- SW — SOLID WASTE
- TR — TRENCH
- VS — VEGETATION STRESS
- WD — WASTE DISPOSAL AREA
- WL — WETLAND